Math 361, Section D13 and D14, Fall 2007
Quiz 8, October 29 **Name:** _____

1. Let X be a continuous random variable with density

$$f(x) = \begin{cases} Cx^3 & \text{if } 0 \leq x \leq 2 \\ 0 & \text{else} \end{cases}$$

(a) [5 points] Find the constant C.

(b) [5 points] Compute $\mathbb{E}[X^2]$.

Answers

1. (a) We must have

$$1 = \int_{x=-\infty}^{\infty} f(x)dx = C\int_{x=0}^{2} x^3 dx = C\frac{2^4}{4} = 4C$$

so $C = 1/4$.

(b) We compute that

$$\mathbb{E}[X^2] = \int_{x=-\infty}^{\infty} x^2 f(x)dx = \frac{1}{4}\int_{x=0}^{2} x^2 x^2 dx = \frac{1}{4}\frac{2^5}{5} = \frac{32}{4\times 5} = \frac{8}{5}.$$